

Future Roadway and Highway Conditions

Background

The Greensboro area has experienced sustained growth over the past several decades, even more so than the Triad region as a whole. This growth is expected to continue over the next 25 years, although at a somewhat slower pace. Population inside the MPO boundary grew from 292,000 in 2000 to an estimated 315,000 in 2004. This population is expected to be 372,000 in 2014; 401,000 in 2020; and 449,000 by 2030.

Employment within the Greensboro MPO planning area is expected to grow at a slightly faster pace than in recent years, although at a slightly slower rate than population, overall. The estimated employment total in 2000 was 193,000. Today it is approximately 203,000. Forecasts predict employment levels of 227,000 by 2014; 244,000 by 2020; and 274,000 in 2030.

Future Roadway Conditions

During the period from 2002 through 2030, traffic in the Greensboro MPO is expected to grow at a faster rate than population (a 55% increase in vehicle miles traveled (VMT), versus 48% growth in population). Over the same time period, lane-miles will increase by only 15% over existing conditions, based on construction of committed highway projects.

This “existing plus committed” or “E+C” network serves as the baseline for evaluating future travel conditions. It represents those state and City transportation projects which can reasonably be assumed complete by 2030, as demonstrated by existing financial commitments in the TIP and CIP, and based on the status of planning, environmental documentation, design, and construction for each project.

The E+C network adds approximately 400 lane-miles to the current roadway network. Two-thirds of this mileage is freeway construction, mainly associated with completion of the Urban Loop and I-40 widening projects, plus construction of the NC 68/US 220 connector (Future I-73). Most of the remaining lane-miles are associated with arterial widenings. The effects of transit and other non-automobile modes, as well as travel-demand strategies, are assumed to remain proportionate to today’s levels.

Although the capacity improvements associated with the E+C network will provide significant congestion relief and other benefits, these benefits will not be enough to offset all the traffic growth anticipated through 2030. Overall, conditions will probably be better than they are now for a period between 2010 and 2020, depending on project completion schedules and actual growth patterns. But by 2020, conditions are expected to have degraded significantly. Problems will be most noticeable west of downtown and in the airport area. I-40 will again become congested, as will parallel arterials like West Market Street and Friendly Avenue. NC 68 will remain a bottleneck, and conditions will deteriorate on Wendover Avenue, High Point Road, Holden Road, and Guilford College Road. US 29 north, US 220 north, Battleground Avenue, and Benjamin Parkway all will experience significant congestion. Even northwestern portions of the Urban Loop will see decreases in level of service.

A complete list of key facilities expected to experience high levels of delay and heavily congested peak-hour conditions follows:

- I-40 from Patterson Street to Forsyth County line
- Friendly Avenue from Wendover Avenue to Market Street
- Market Street from Holden Road to Bunker Hill Road (in Colfax)
- Wendover Avenue from Bridford Parkway to Spring Garden Street; from Friendly Street to US 29
- Spring Garden from Spring Street to Market Street
- Lee Street from Patterson Street to Edward R. Murrow Boulevard
- Holden Road from US 220/Battleground Avenue to West Meadowview Road
- Guilford College Road from Friendly Avenue to I-40
- New Garden Road from Fleming Road to Friendly Avenue
- Elm Street from Willoughby Boulevard to Bessemer Avenue
- NC 68 from Rockingham County line to southern MPO boundary (adjacent to High Point)
- Pinecroft Road from High Point Road to Vandalia Road
- Vandalia Road from Groometown Road to I-85
- Alamance Church Road from the Urban Loop to Southeast School Road
- Creek Ridge Road from Randleman Road to Spring Road
- US 70 from Penry Road to Birch Creek Road
- Battleground Avenue from Cornwallis to Wendover; from Horse Pen Creek Road to US 220-NC 68 Connector
- Aycock Street from Friendly Avenue to Florida Street
- Lovett Street from Florida Street to Freeman Mill Road
- Freeman Mill Road from Lovett Street to I-40

- Lawndale Drive from Lake Jeannette Road to Pisgah Church Road
- Martinsville Road from Lawndale Drive to US 220/Battleground Avenue
- Cone Boulevard from US 220/Battleground Avenue to Church Street
- Martin Luther King, Jr. Drive from Lee Street to I-40
- Hicone Road from US 29 to Hines Chapel Road
- Church Street from Fisher Avenue to Pisgah Church Road
- Urban Loop from Bryan Boulevard to Lawndale Drive

More general observations about future conditions include the following:

- Most of the system-level benefits from the E+C improvements are attributable to the substantial amount of freeway construction. This causes a shift in the largest share of future VMT deficiencies from freeways to surface streets, especially minor arterials. As the area continues to urbanize, these “workhorse” facilities will become more and more important, especially in terms of lane-miles and system maintenance responsibilities (state versus City). They also serve as the backbone of an effective local public transit system. In addition, the effectiveness of the freeway system depends greatly on the network of surface streets that provide access. Freeway capacity is compromised if traffic cannot get on or off of the freeway due to congested arterials, especially at key interchanges.
- Capacity improvements should focus on eliminating choke points and filling in “missing links.” Many of these types of deficiencies result from the lack of direct and convenient cross-town traffic service, especially in the east-west direction. Without appropriate improvements, traffic will be forced to use indirect routes, zigzagging on radial and circumferential facilities, cutting through on neighborhoods on local streets, and using up freeway and interchange capacity for short trips. Adequate cross-town arterials also will be important for efficient and reliable future transit service expansion.
- Given the expense and difficulty of further roadway construction and widening, every effort should be made to maximize operational efficiency and manage the demand for automobile travel. The new ***Greensboro Urban Area Congestion Management System (CMS)*** provides an effective tool for accomplishing this task. The CMS identifies a continuous program of data collection and management, performance monitoring, traffic demand reduction, and traffic operation improvements. Elements of the CMS include:

- *Data Collection and System Monitoring* – Conduct surveys and studies of traffic volumes, vehicle occupancy rates, travel speeds, time-of-day characteristics, level of service/travel delay, pedestrian volumes, transit use, etc.
- *Alternative Modes* – Encourage the use of alternative modes (walking, bicycling, and transit)
- *Vehicle Occupancy* – Promote higher vehicle occupancy rates through various ridesharing programs (including vanpools, rideshare matching, guaranteed ride home, park-and-ride/kiss-and-ride lots, etc.)
- *Travel Demand Management* – Reduce demand for roadway capacity by such means as flexible working hours, telecommuting, strategic parking policies, more efficient mixed-use development patterns, etc.
- *Signal Systems/ITS* – Maximize efficiency of the existing roadway network by coordinating and optimizing traffic signals and employing surveillance cameras, variable message boards (and other traveler information systems) to deal with both recurring congestion and non-recurring incidents.

By coordinating these components of the CMS, and integrating them into the LRTP, available capacity (or infrastructure investments) can be preserved and used as effectively as possible. Typically, recommendations from the CMS are intended for implementation over the next 1-to-10 years. To ensure the timely consideration of all non-construction alternatives, any congestion problem addressed by a project in the Recommended LRTP should already have been identified in the CMS.

- The high percentage of truck and through traffic on major freeways constrains the potential benefits of transit improvements and travel demand reduction on these facilities. Additional planning for freight movement is recommended.
- Although not the largest problem in terms of total VMT or delay, the urbanization of fringe areas will trigger significant relative increases in traffic volumes on two-lane rural and local roads. Typically, the widespread and sometimes dramatic nature of these changes will lead to the perception of a problem that is out of proportion to its actual impacts.

System-Level Performance Measures: E+C

Prior to analyzing possible future year scenarios, it is helpful to establish a baseline for the more quantitative measures of effectiveness (MOE). As in the analysis of the existing conditions, all statistics given below are based on the Piedmont Triad Regional Travel Demand Model (PTRTDM), and are reported for the Greensboro Urban Area.

Table 3.1 summarizes the changes in VMT between the base year and the future year E+C networks. Most notable is the significant increase in VMT on freeways. This is not wholly surprising, however, given the substantial increase in freeway lane-miles, including construction of the Urban Loop and the NC 68-220 Connector, plus completion of the I-40/US 421 widening.

Table 3.1 — Daily Vehicle Miles of Travel

Functional Class	2002	2030 E+C	% Increase
Freeway	4,898,000	8,439,000	72%
Arterial	4,695,000	6,385,000	36%
Collector	2,908,000	4,544,000	56%
TOTAL	12,500,000	19,368,000	55%

The vehicle hours of travel (VHT) for both 2002 and 2030 E+C are summarized in **Table 3.2**. In general, the increases follow the same pattern as with the changes in VMT. Unfortunately, the percent growth in VHT exceeds that in VMT for all functional classes. The “average speed” by functional class will decrease over the planning horizon. This decrease can be seen in **Table 3.3**.

Table 3.2 — Daily Vehicle Hours of Travel

Functional Class	2002	2030 E+C	% Increase
Freeway	100,400	183,600	83%
Arterial	119,700	177,500	48%
Collector	77,900	127,000	63%
TOTAL	298,000	488,000	64%

Table 3.3 – Daily “Average Speeds” (VMT/VHT)

Functional Class	2002	2030 E+C	% Increase
Freeway	48.8	46.0	-6%
Arterial	39.2	36.0	-8%
Collector	37.3	35.8	-4%
TOTAL	41.9	39.7	-5%

Figures 3.1 and 3.2 graphically depict the relationships between 2002 and 2030 E+C VMT and VHT, by functional class.

Figure 3.1 – 2002 vs. 2030 E+C: Daily VMT by Functional Class

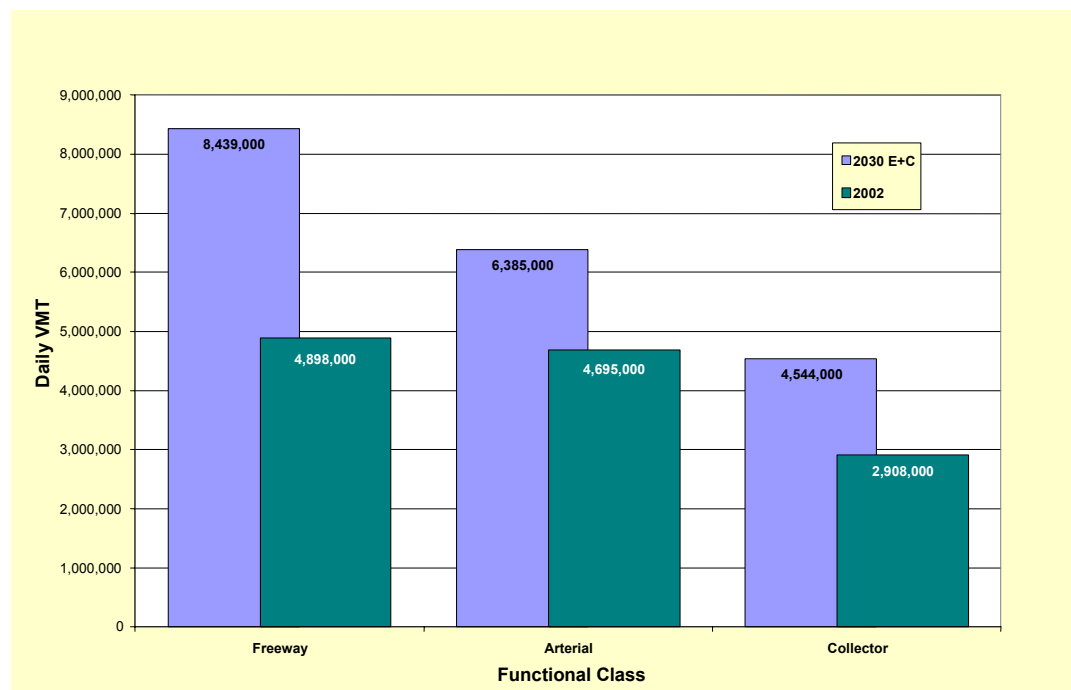
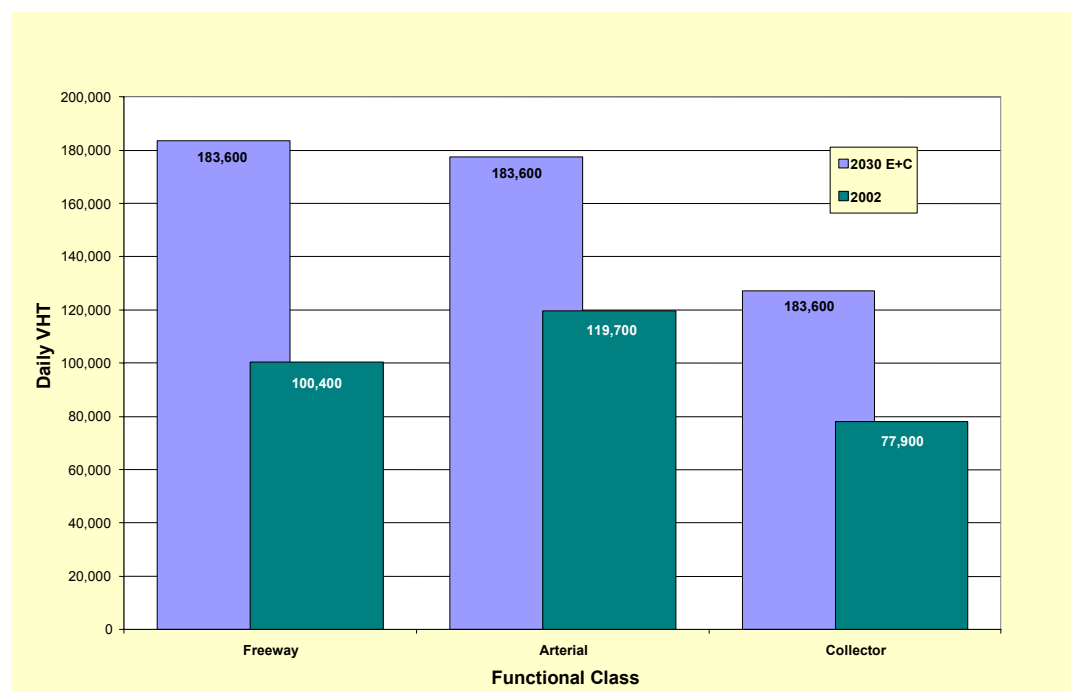


Figure 3.2 — 2002 vs. 2030 E+C: Daily VHT by Functional Class



Alternatives Analysis

Having established the 2030 E+C network as a baseline for assessing the performance of proposed future year solutions, several scenarios were developed. The first two scenarios were intended to represent contrasting strategies for addressing travel deficiencies. By analyzing the differences in their performance (both relative to the E+C network and to each other), it is possible to evaluate the strengths and weaknesses of each approach. The E+C network identifies the critical deficiencies; the different scenarios are assessed on the degree to which they address these deficiencies. Then, consideration is given to the relative costs of each scenario, and to the impacts of each on the natural environment and on existing communities. This analysis also reveals which deficiencies are most amenable to which type of solution, and which are not significantly improved in either case. All of these factors can then be weighed, and through an interactive public involvement process, used to develop a set of final recommendations.

Highway Focus

The first scenario developed for comparison with the E+C baseline was the Highway Focus Scenario. This scenario starts with the

E+C network, and adds roadway capacity at locations experiencing substantial congestion. Public transportation and bicycle and pedestrian improvement programs are maintained at the same level as in the E+C baseline. The strategy behind the Highway Focus Scenario is to assess the effectiveness of liberally increasing roadway capacity in an attempt to reduce congestion. In order to fully realize this objective, environmental and community impacts were not considered in project selection; the only criteria were the potential to improve traffic flow and reduce delay. For example, widenings are proposed for such highly-urbanized facilities as Friendly Avenue and Market Street, even though these corridors are heavily developed and would be seriously disrupted by widening projects. Capacity is not considered to be unbounded, however. Arterials are limited to six through lanes, and freeways constrained to eight.

Under this scenario, just fewer than 250 lane-miles are added to the E+C network. Most of these additions (about 140 lane-miles) are to the arterial system, mainly existing facilities that are widened, and missing links that are filled in. The remainder of the new capacity is divided nearly equally between freeways and collectors/locals. Most of the projects in the western portion of the study area are new freeways and arterial widenings. In other areas, construction of missing arterial links dominates.

This scenario results in less congestion than the E+C network, but does not eliminate it. Many areas exhibiting moderate congestion in the E+C analysis receive no significant relief from the Highway Focus Scenario, since this strategy focuses heavily on the most congested locations. Moreover, because of its emphasis on increasing capacity (with no corresponding goal to improve accessibility or connectivity), this scenario provides very few desirable alternatives to driving on congested facilities that have already reached their capacity limits.

Alternative Focus

The second scenario focuses on alternatives to highways and the single-occupancy vehicle. It is intended to explore the potential benefits of increased transit use, higher vehicle occupancy rates, pedestrian-friendly design, and travel demand management programs in the absence of added roadway capacity. This would be accomplished through increased transit service, as well as travel demand management through ride-sharing programs and other incentives.

Since the existing travel demand model lacks the ability to predict transit ridership, pedestrian trips, travel demand management programs, or other strategies just listed, it was decided to assume an ambitious set of programs were in place to reduce automobile

travel, by encouraging transit and pedestrian travel, increasing vehicle occupancy, and implementing travel demand management strategies. Automobile trip reductions consistent with these assumptions were estimated, and these trips were then removed from the vehicle-trips assigned to the network in the E+C baseline (and Highway Focus Scenario). While no specific routes, services, or modes are identified (i.e., the proposed PART regional rail service), the Alternative Focus Scenario assumes very high levels of transit use, well beyond the ridership associated with any local or regional transit system currently proposed.

The effects of the assumptions in this scenario are concentrated in the urbanized area of Greensboro likely to be served by transit in 2030. This area consists of the most densely developed traffic analysis zones (TAZs) in the urban area, containing a mixture of residential and non-residential land uses. Similarly, the network of streets and sidewalks serving these zones is the most suitable to pedestrian activity and transit operations, relative to other parts of the urbanized area. This area of future transit service is assumed to include 230 of the 554 traffic analysis zones in the model study area, containing more than 124,000 households (286,000 persons) in 2030.

Within the area defined above, an additional 10 percent of all home-based work (HBW), 8 percent of all home-based other (HBO), and 3 percent of all non-home based (NHB) trips are assumed to take transit, rather than driving. The result is just over 100,000 transit trips per day (~130,000 unlinked transit trips) within the MPO boundary. This translates into a transit mode share of approximately 10% (or nearly one transit trip per household each day).

For zones in the Greensboro area assumed not served by transit under this scenario, a 2 percent increase in vehicle occupancy for HBW trips was assumed. This increase results from ridesharing and park-and-ride programs, and translates to the elimination of another 11,300 vehicle trips. No changes were assumed for zones outside the MPO boundary. However, another 30,000 vehicle-trip reduction within the urban area is attributed to non-transit modes, land use changes, and related travel demand management strategies. In all, 114,300 vehicle trips (out of about 2 million in the MPO model area) were eliminated under this scenario.

L RTP

The Recommended L RTP resulted from the evaluation of the two scenarios described above, combined with input from the public involvement process. The Recommended L RTP builds on the projects in the 2030 E+C network, as well as the previous L RTP. It represents an attempt to improve accessibility and reduce traffic

congestion, while recognizing the limitations of expanding roadway capacity. While assumptions regarding transit, ride-sharing, or travel demand management are the same as those in the E+C baseline, roadway improvement projects in the Recommended LRTP are fiscally constrained, and reflect attempts to minimize negative environmental and community impacts. Careful consideration is also given to the logical staging and programming of projects, in order to maximize efficiency and cost effectiveness, while minimizing disruptions.

The Recommended LRTP does not include many of the major arterial widenings proposed in the Highway Focus Scenario. These projects were deemed prohibitively expensive and disruptive, and therefore not feasible. The Recommended LRTP also differs from the Highway Focus Scenario in more subtle ways, emphasizing only those improvements that best address the community's most critical travel needs. Projects with the potential to create new problems (such as generate additional VMT, congestion, or delay) were eliminated or modified. There are actually a few more lane-miles of freeway in the Recommended LRTP than in the Highway Focus Scenario, the result of slight refinements to the Airport and I-40/I-73/NC 68 Connectors. Interchange locations and configurations along US-421 south also were modified. Several cross-town arterial connections and "missing links" were eliminated, added, or altered, especially on the southern and eastern sides of Greensboro. Overall, the Recommended LRTP adds just over 200 lane-miles to the E+C network (versus nearly 250 lane-miles added in the Highway Focus Scenario).

Comparisons of Scenarios

Tables 3.4 through 3.6 summarize the Measures of Effectiveness (MOE) results for each of the scenarios by functional class. An analysis of the VMT reveals few surprises. The Highway Focus Scenario, as well as the LRTP, results in an increase in VMT over the 2030 E+C baseline; given the significant expansion of lane-miles, this is not surprising. Nor is it surprising that the Alternative Focus Scenario reduces VMT, in comparison with the E+C. In all cases, however, the total daily VMT falls within 1.5 percent of the E+C network, a relatively minor difference.

One item of note is that, of all the scenarios, the Recommended LRTP has the lowest VMT for non-freeway roads, and the highest freeway VMT. Although the Recommended LRTP includes only a modest increase in freeway lane-miles over the E+C, these significantly improve connectivity and allow for greater utilization of existing capacity. The resulting higher travel speeds have the effect of diverting traffic away from lower classification roadways.

Table 3.4 – Comparison of 2030 Alternatives - Daily Vehicle Miles of Travel

VMT	E+C	Recommended LRTP	Highway Focus	Alternative Focus
Freeway	8,744,000	9,085,000	8,879,000	8,667,000
Arterial	6,296,000	6,184,000	6,440,000	6,175,000
Other	4,533,000	4,346,000	4,297,000	4,445,000
TOTAL	19,573,000	19,615,000	19,616,000	19,287,000

The Recommended LRTP also has the lowest VHT of all the scenarios, although by only a slight margin. On the surface, this finding may seem surprising; it would probably be assumed that the Highway Focus Scenario, with over 40 additional lane miles (a 22% larger increase), would provide the least congested travel, and the lowest VMT. Although the Highway Focus Scenario provides extra capacity on high-demand arterial corridors, it continues to attract trips to lower-speed facilities that remain congested, despite extensive widening. The Recommended LRTP, on the other hand, avoids crossing this point of diminishing returns, and provides a better fit between capacity and travel demand. This is attributed to the “fine-tuning” of freeway improvements, combined with the elimination of several of the major arterial widening projects from the Highway Focus Scenario. These changes resulted in a more optimal system, with a very efficient freeway network.

Table 3.5 – Comparison of 2030 Alternatives - Daily Vehicle Hours of Travel

VHT	E+C	Recommended LRTP	Highway Focus	Alternative Focus
Freeway	182,000	172,000	174,000	180,000
Arterial	176,000	153,000	167,000	171,000
Other	127,000	117,000	117,000	124,000
TOTAL	485,000	442,000	458,000	475,000

Table 3.6 – Comparison of 2030 Alternatives – Lane-Miles

Total Lane-Miles	E+C	Recommended LRTP	Highway Focus	Alternative Focus
Freeway	826	897	879	826
Arterial	1,131	1,202	1,271	1,131
Other	1,066	1,126	1,119	1,066
TOTAL	3,023	3,225	3,269	3,023

As **Tables 3.7 through 3.9** confirm, the Recommended LRTP does not eliminate as much congestion as the Highway Focus Scenario. But it does keep a larger share of its VMT on freeways (instead of surface streets), maintaining a higher overall travel speed. By any of these level-of-service based measures, however, both the Highway Focus Scenario and Recommended LRTP (and only these two scenarios) provide significant benefits. **Figures 3.3 through 3.6** depict this same information in a graphical format.

Analysis of the various scenarios confirms some earlier findings, and leads to some new ones:

- In terms of functional classification, the bulk of transportation deficiencies will shift from freeways (today) to arterials (by 2030).
- Increasing roadway capacity can reduce congestion, but it can also result in longer (but faster) trips. This can lead to undesirable increases in VMT.
- VMT alone is not an adequate performance measure, however. The level of congestion (VMT occurring in over-capacity conditions, both in absolute and relative terms) and the speeds at which VMT occurs are critical in assessing energy consumption, air quality, and other impacts.
- Traffic management techniques designed to optimize performance and preserve capacity are critical. They can be implemented relatively quickly, and will become even more cost-effective over time, as construction, right-of-way, and mitigation costs continue to escalate.
- Transit and other non-highway modes and strategies can have significant impacts, especially in certain corridors and time periods. However, it is difficult to reduce persistent, large-scale congestion using these techniques alone, because:

*Greensboro Urban Area
2030 Long Range Transportation Plan*

- These alternatives tend to affect shorter trips, rather than long ones.
- Traffic will shift in time and location to take advantage of new capacity, whether this capacity is the result of construction, or has been freed up by transit trip reduction programs.

Table 3.7 – Comparison of 2030 Alternatives – Over Capacity VMT

Over-Capacity VMT (v/C >1, directional)	E+C	Recommended LRTP	Highway Focus	Alternative Focus
Freeway	2,551,000	1,423,000	1,249,000	2,402,000
Arterial	2,801,000	2,523,000	1,759,000	2,603,000
Other	678,000	465,000	370,000	643,000
TOTAL	6,030,000	4,411,000	3,378,000	5,648,000

Table 3.8 – Comparison of 2030 Alternatives – Lane-Miles Over Capacity

Lane-Miles Over Capacity (v/C >1, directional)	E+C	Recommended LRTP	Highway Focus	Alternative Focus
Freeway	161	98	80	151
Arterial	313	290	203	294
Other	81	52	44	77
TOTAL	555	440	327	522

Table 3.9 – Comparison of 2030 Alternatives – “Average Speed”

“Average” Speed (VMT/VHT, mph)	E+C	Recommended LRTP	Highway Focus	Alternative Focus
Freeway	48	53	51	48
Arterial	36	40	39	36
Other	36	37	37	36
TOTAL	40	44	43	41

Recommended Roadway Investments

As previously mentioned, the recommended list of projects was developed based on the technical analysis as well as input obtained during the public involvement process. The recommendations also reflect consideration of the revised Thoroughfare Plan discussed in Chapter 5 of this report. The overall roadway investment strategy builds on the projects in the 2030 E+C network with a focus on both increasing accessibility and reducing congestion. The horizon year of the Long Range Transportation Plan is 2030. Nearly all of the connections shown on the Thoroughfare Plan are anticipated to be made by that time. Most of these connections will be made by 2020.

The following are summaries for the recommended roadway investments for each of the horizon years: 2004, 2014, 2020, and 2030. Also, for each horizon year, a table of proposed projects and corresponding maps by horizon years is provided.

Figure 3.3 — Comparison of 2030 Alternatives - Daily Vehicle Miles of Travel

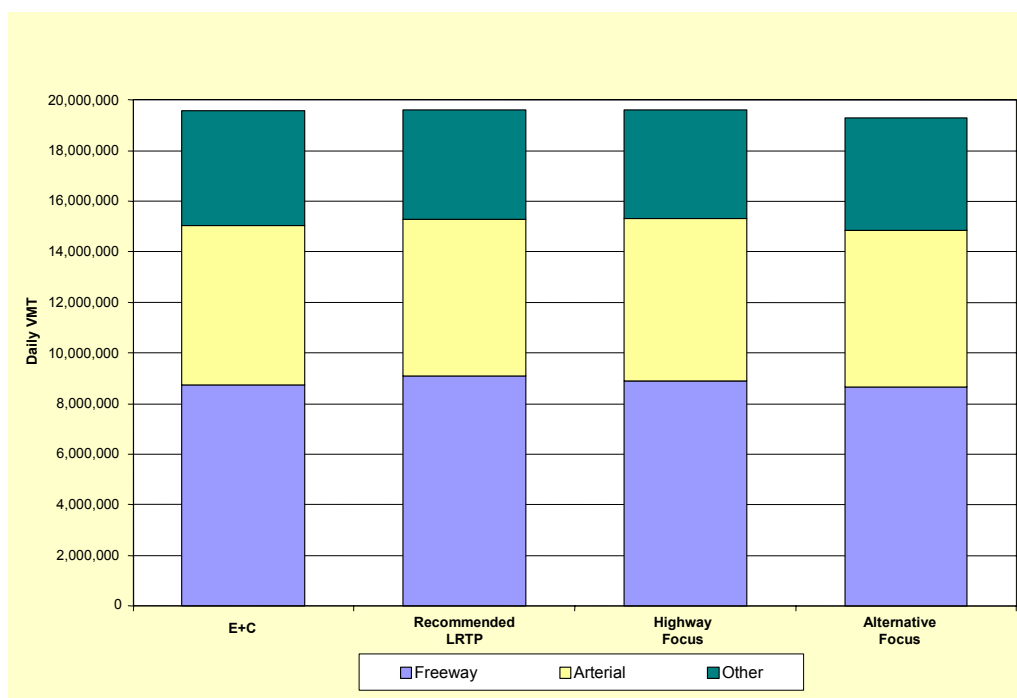


Figure 3.4 – Comparison of 2030 Alternatives - Daily Vehicle Hours of Travel

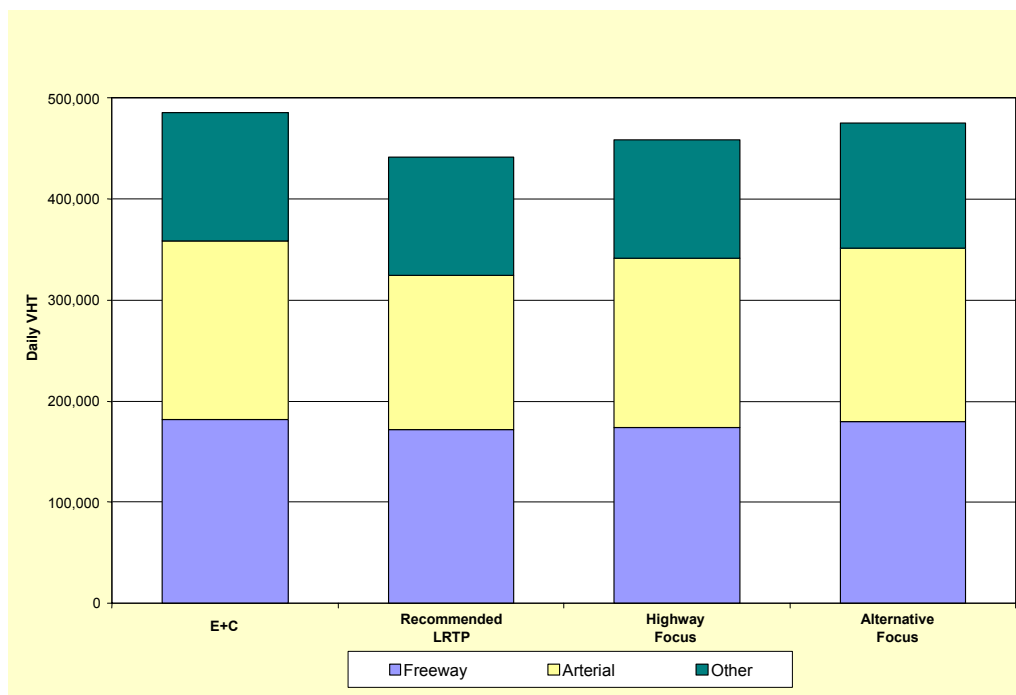


Figure 3.5 – Comparison of 2030 Alternatives – Over Capacity VMT

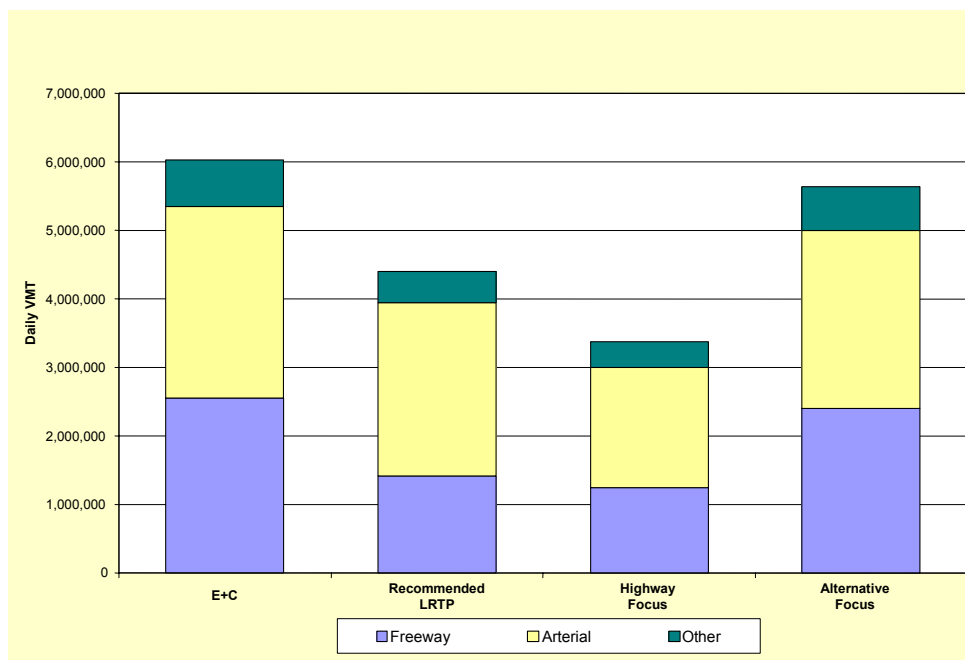
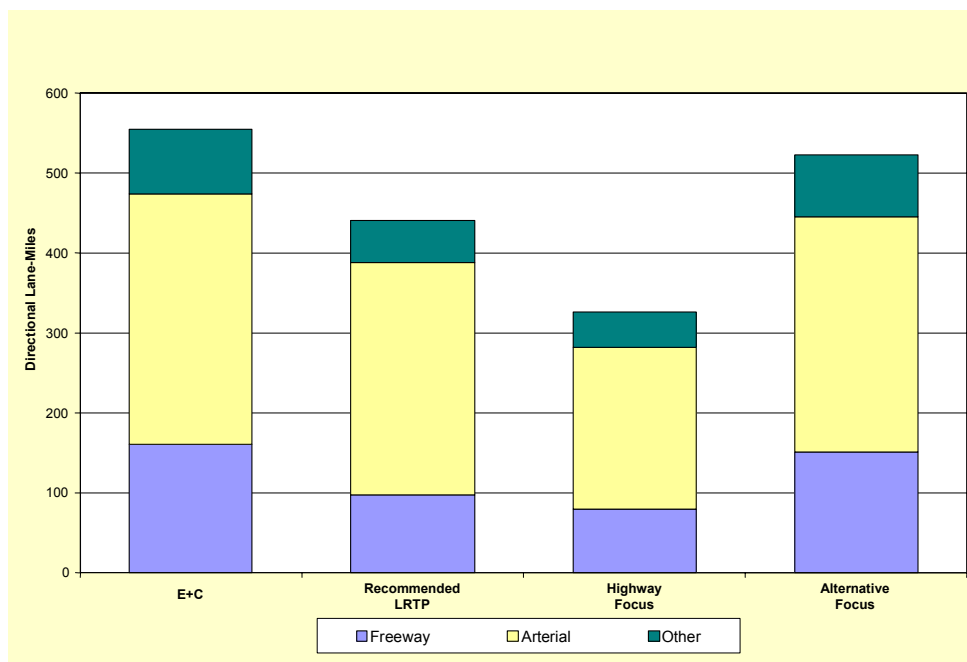


Figure 3.6 – Comparison of 2030 Alternatives – Over Capacity Lane-Miles



Tables 3.10, 3.11, 3.12, and 3.13 inventory the roadway projects that are expected to be complete in each horizon year. Horizon year project maps depict these projects and are included as **Maps 3.1, 3.2, 3.3, and 3.4**. Additional information regarding project cost a funding can be found in the Financial Element (Chapter 12) of this plan.

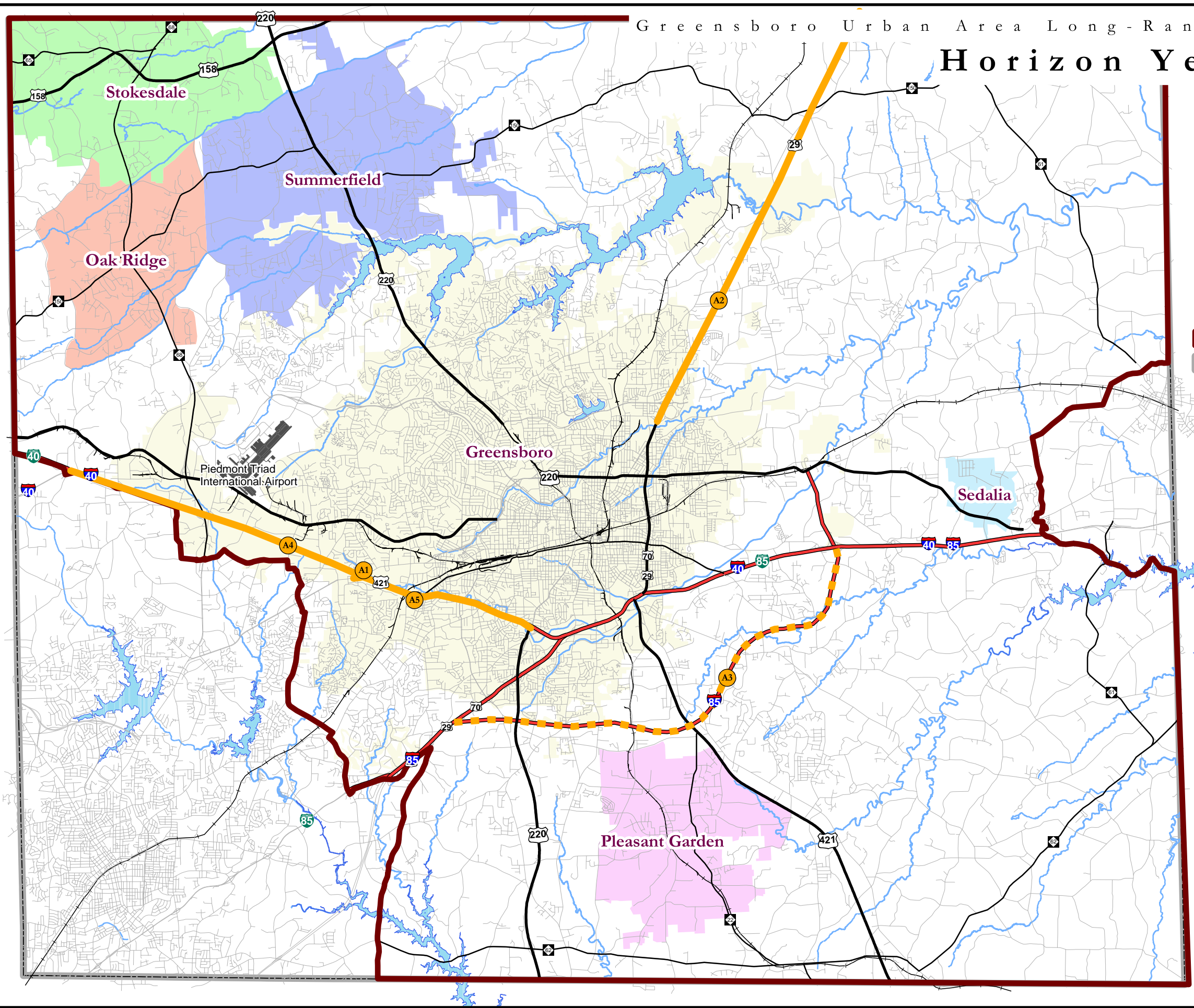
2004 –Base Year

This time period reflects the construction of many of the projects scheduled and funded in the state transportation improvement program (TIP), including the completion of the southern portion of the Greensboro Urban Loop.

Table 3.10 — 2004 Base Year Roadway Projects

2004								
ID	TIP#	Facility	Description / Extents	Length (miles)	Existing # Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?
A1		Wendover Avenue	Big Tree Way to Stanley Rd.	0.4	4 lane	6 lane	Major Arterial	Yes
A2	R-984	US 29	16th St. to Rockingham County line (pavement rehab)	10.9	4 lane divided	4 lane divided	Freeway/Expressway	Yes
A3	I-2402	Southern Urban Loop (I-85)	I-85 to Clapp Farm Rd.	14.7	N/A	6 lane freeway	Interstate	Yes
A4	I-2201	I-40 / US 421	Bus. 40 to W of Freeman Mill Rd.	10.9	4 lane freeway	8 lane freeway	Interstate	Yes
A5	P-3416	Norwalk Street Extension	Lee Street to Boston Road (rail crossing closing project)	0.3	N/A	3 lane	Local	No
A6		Spring Garden Street Median	Between Freeman Mill Rd. and Jackson St.	0.3	4 and 2 lane	Divided	Collector	No
Projects not completed in 2004								
B2		Friendly Avenue	Westridge Rd. to Holden Rd., add medians & LT lanes. (refer to 2014 for the remainder)	1.4	4 lane	4-5 lane	Minor Arterial	No
B3		Creek Ridge Road	Randleman Rd. to US 220. (refer to 2014 for the remainder)	1.2	2 lane	3 lane	Collector	No
B5		Elm-Eugene Street	Vandalia Rd. to Southern Urban Loop (I-85 Bypass). (right-of-way / planning only; refer to 2014 for the remainder)	1.1	2 lane	5 lane	Minor Arterial	No
B11		Horsepen Creek - Fleming Connector	Horse Pen Creek Rd. to Fleming Rd. (includes extending existing x-sections). (planning only; refer to 2014 for the remainder)	0.7	N/A	3 lane	Collector	No
B13	U-2913 (part)	Guilford College Road	Widen from Hornaday Rd. to Ruffin Rd. (refer to 2014 for more; remainder of the project is located in High Point)	1.1	2 lane	4-5 lane	Minor Arterial	Yes
B16	U-4015 (part)	Gallimore Dairy Road	NC 68 to I-40. (not open to traffic in '05 - refer to 2014 for more; remainder of the project is located out of area)	1.0	2 lane	5 lane	Collector	No
B18	U-2524 (part)	Western Urban Loop	I-85 to Lawndale Dr. (not open to traffic in '05; refer to 2014 for the remainder)	15.0	N/A	6 lane freeway	Interstate	Yes
B19	R-2413 (part)	NC 68 / US 220 Connector	Pleasant Ridge Rd. to US 220 & widening to Rockingham Co. line. (not open to traffic in '05 - refer to 2014 for more; remainder of the project is located in Rockingham Co.)	9.8	N/A	4 lane freeway	Interstate	Yes
B22	U-3612 (part)	Hilltop Road	Guilford College Rd. to Adams Farm Pkwy. (right-of-way only; refer to 2014 for the remainder)	1.0	2 lane	4-5 lane	Minor Arterial	No
B24	U-3313 (part)	Groometown Road	Wiley Davis Rd. to Wayne Rd. (right-of-way only; refer to 2014 for the remainder)	1.2	2 lane	4-5 lane	Minor Arterial	No
B26		Hornaday Road / Chimney Rock Road Connector	Hornaday Rd. to Chimney Rock Rd. (not open to traffic in '05; refer to 2014 for the remainder)	1.0	N/A	3 lane	Local	No
B32		East Market Street	Streetscape and Traffic Management. (refer to 2014 for the remainder)	1.5	6 lane divided	4 lane divided	Principal Arterial	No

Horizon Year 2004 Projects Map 3.1



Legend

- Metropolitan Area Boundary
- County Line
- Interstates
- US Highways
- State Highways
- Railroads
- 2004 Project Reference
- New Location Projects**
 - 2004
- Horizon Year Projects**
 - 2004

0 0.5 1 2 3 4 5 Miles



August 26, 2004

Mapping prepared by Kimley-Horn and Associates, Inc.
for the Greensboro Urban Area Long-Range Transportation Plan
Data Sources: Guilford County, the City of
Greensboro, FEMA, the U.S. Census Bureau, KHA,
and NCDOT

2005-2014

A significant amount of investment programmed and funded in the TIP is scheduled for completion during this time period including the western portion of the Greensboro Urban Loop and the NC 68/220 connector. This time period also reflects several projects programmed in the City of Greensboro Capital Improvements Program.

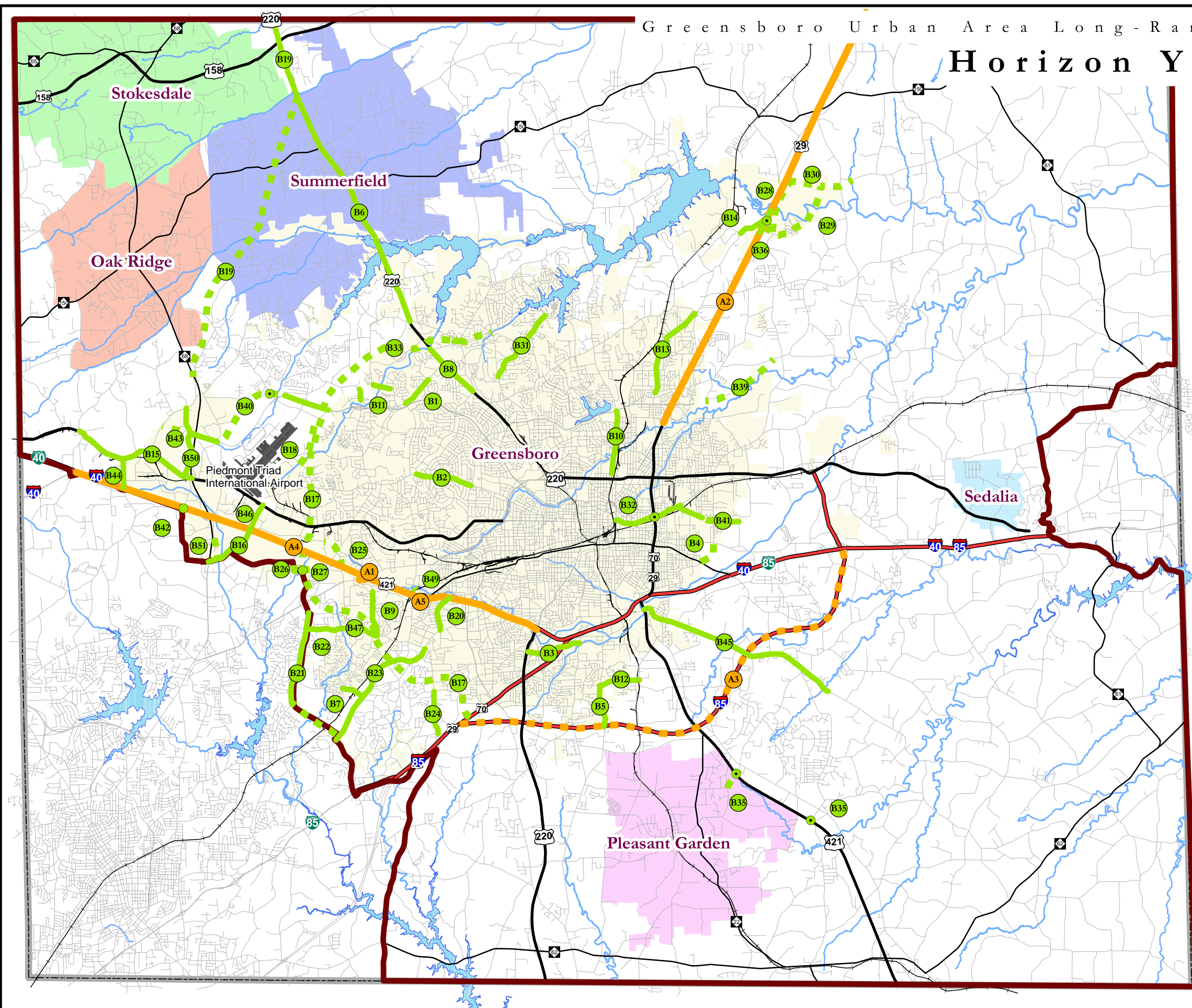
Table 3.11 — 2014 Roadway Projects

2005 - 2014								
ID	TIP#	Facility	Description / Extents	Length (miles)	Existing # Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?
B1		New Garden Road	Jefferson Rd. to Brassfield Rd.	1.0	2 lane	4-5 lane	Minor Arterial	No
B2		Friendly Avenue	Westridge Rd. to Holden Rd., add medians & LT lanes (refer to 2004 for the remainder)	1.4	4 lane	4-5 lane	Minor Arterial	No
B3		Creek Ridge Road	Randleman Rd. to US 220 (refer to 2004 for the remainder)	1.2	2 lane	3 lane	Collector	No
B4		Franklin Boulevard / Florida Street Connector	McConnell Rd. to Lee St.	0.6	2 lane	3-4 w/ median	Collector	No
B5		Elm-Eugene Street	Vandalia Rd. to Southern Urban Loop (I-85 Bypass) (refer to 2004 for the remainder)	0.8	2 lane	5 lane	Minor Arterial	No
B6	R-2309	US 220	Horsepen Creek Rd. to US 220 - NC 68 Connector	6.3	2 lane	4-5 lane	Principal Arterial	Yes
B7		Mackay Road	High Point Rd. to Adams Farm Pkwy.	0.5	2 lane	5 lane	Collector	No
B8		Battleground Avenue	Cotswold Ave. to Westridge Rd.	1.3	5 lane	6-7 lane	Principal Arterial	Yes
B9		Stanley Road	Koger Blvd. to Hilltop Rd.	1.1	2 lane	5 lane	Collector	No
B10		Church Street	Cone Blvd. to Northwood St.	1.5	3 lane	5 lane	Collector	No
B11		Horse Pen Creek - Fleming Connector	Horse Pen Creek Rd. to Fleming Rd. (includes extending existing cross-sections) (refer to 2004 for the remainder)	0.7	N/A	3 lane	Collector	No
B12		Vandalia Road	Elm-Eugene St. to Pleasant Garden Rd.	1.0	2 lane	5 lane	Minor Arterial	No
B13		Summit Avenue	McKnight Mill Rd. to Brightwood School Rd.	2.3	2 lane	4-5 lane	Minor Arterial	No
B14		Summit Avenue	Bryan Park to Reedy Fork Pkwy.	0.8	2 lane	4-5 lane	Minor Arterial	No
B15	R-2611	West Market St.	NC 68 to Bunker Hill Rd.	3.6	2 lane	4-5 lane	Major Collector	Yes
B16	U-4015 (part)	Gallimore Dairy Road	NC 68 to I-40 (refer to 2004 for more; remainder of the project is located out of area)	1.0	2 lane	5 lane	Collector	No
B17	U-2524 (part)	Western Urban Loop	I-85 to Lawndale Dr. (refer to 2004 for the remainder)	15.0	N/A	6 lane freeway	Interstate	Yes
B18	U-2524 (part)	Chimney Rock Road Extension	Existing facility to Old Oak Ridge Rd. (part of B17)	1.3	N/A	2 lane	Local	No
B19	R-2413 (part)	NC 68 / US 220 Connector	Pleasant Ridge Rd. to US 220 + widening to Rockingham Co. line (refer to 2004 for more; remainder of the project is located in Rockingham Co.)	9.8	N/A	4 lane freeway	Interstate	Yes
B20		Merritt Drive	I-40 to High Point Rd.	1.0	3 lane	5 lane	Collector	No
B21	U-2913 (part)	Guilford College Road	Widening from Ruffin Rd to new alignment	2.3	2 lane	4-5 lane	Minor Arterial	Yes
			New alignment from widening to High Point Rd. (refer to 2004 for more; remainder of the project is located in High Point)	1.5	N/A	4 lane divided	Minor Arterial	Yes
B22	U-3612 (part)	Hilltop Road	Guilford College Rd. to Adams Farm Pkwy. (refer to 2004 for the remainder)	0.6	2 lane	4-5 lane	Minor Arterial	No
B23	U-2412 (part)	High Point Road	Hilltop Rd. to Proposed US 311 Bypass (portion in High Point MPO)	3.8	3 lane	4-5 lane	Principal Arterial	Yes

2005 - 2014 (continued)								
ID	TIP#	Facility	Description / Extents	Length (miles)	Existing # Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?
B24	U-3313 (part)	Groometown Road	Wiley Davis Rd. to Wayne Rd. (refer to 2004 for the remainder)	1.2	2 lane	4-5 lane	Minor Arterial	No
B25	U-4006	Bridford Parkway Extension	Wendover Ave. at Hornaday Rd. to Burnt Poplar Rd. at Swing Rd.	1.1	N/A	5 lane	Collector	No
B26		Hornaday Road / Chimney Rock Road Connector	Hornaday Rd. to Chimney Rock Rd. (refer to 2004 for the remainder)	1.0	N/A	3 lane	Local	No
B27	U-2524 (part)	Hornaday Road / Chimney Rock Road Connector	Bridge over Urban Loop	N/A	N/A	3 lane	N/A	No
B28		Reedy Fork Service Road	Turner-Smith Rd. Ext. to Reedy Fork Pkwy.	1.4	N/A	5	Local	No
B29		Reedy Fork Parkway	Turner-Smith Rd Ext to Eckerson Rd.	2.2	N/A	3	Local	No
B30		Turner Smith Road Extension	Connect Brown Summit Rd. to Turner Smith Rd.	2.0	N/A	3 lane	Major Collector	No
B31		Lake Jeanette Road	Lawndale Ave. to N Elm St. / Bass Chapel Rd.	2.2	2-3 lane	3-5 lane	Local	No
B32		East Market Street	Streetscape and Traffic Management (refer to 2004 for the remainder)	1.5	6 lane divided	4 lane divided	Principal Arterial	No
B33	U-2524 (part)	Lake Brandt / Cotswold Connector	Lake Brandt Rd. to Cotswold Rd. (part of B17)	0.3	3 lane	3 lane	Collector	No
B35	R-2612 (part)	US 421	Williams Dairy / Neelley Rd. realignment & interchange + US 421 interchange with Woody Mill Rd. (and future Hagen Stone Park Rd. Connector)	1.2	2 lane	3-5 lane	Freeway / Expressway & Collector	Yes
B36	R-4707	US 29	Eckerson Rd. / US 29 Interchange + 1 mile of freeway upgrade (Assumes U-2524 includes widening of remaining US 29 south to Urban Loop)	1.0	4 lane freeway	6 lane freeway	Freeway/Expressway	Yes
B37	U-4711	Greensboro Signal / ITS System		N/A	N/A	N/A	N/A	No
B38		Church Street	Streetscape, Lindsay St. to Friendly Ave.	0.3	N/A	N/A	Collector	No
B39		East Cone Boulevard Extension	Nealtown Rd. to Hines Chapel Rd.	2.0	N/A	4 lane divided	Minor Arterial	Yes
B40	U-2815 C	Bryan Boulevard	Inman Rd. to NC 68 (relocate roadway & construct interchange at Old Oak Ridge Rd.)	1.9	4 lane divided	4-6 lane divided	Freeway/Expressway	Yes
B41		Holts Chapel Road Upgrade	Alignment & cross-section improvements, E Market St. to Ward Rd.	1.6	2 lane	2-3 lane	Collector	No
B42		Pegg Rd. - Thatcher Rd. Connector	Gallimore Dairy Rd. to Pleasant Ridge Rd. widening and new grade separation at I-40	2.1	N/A	4 lane divided	Collector	No
B43		Bryan Boulevard Extension	NC 68 to Pleasant Ridge Rd.	0.8	N/A	4 lane divided	Major Collector	No
B44		Sandy Ridge Road	I-40 to Market St.	1.0	2 lane	4 lane divided	Major Collector	No
B45		Alamance Church Road	US 421 to Southeast School Rd.	4.7	2 lane	5 lane	Minor Arterial	Yes
B46	U-4015 (part)	Gallimore Dairy Road	I-40 to Market St.	0.6	2 lane	5 lane	Collector	No
B47		Hilltop Road	Widen from Adams Farm Pkwy to Stanley Rd.	1.3	2 lane	5 lane	Minor Arterial	No
B49		Norwalk Street Connector	Boston Rd. over railroad to existing roadway	0.3	N/A	3 lane	Collector	No
B50		Brigham Road	Widen from West Market St. to Pleasant Ridge Rd.	1.7	2 lane	4 lane divided	Collector	No
B51		Regional Road Extension	Gallimore Dairy Rd. to Regional Rd. north of Hickory Ridge Rd. (part existing)	0.6	N/A	3 lane	Collector	No

2005 - 2014 (continued)								
ID	TIP#	Facility	Description / Extents	Length (miles)	Existing # Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?
Projects not completed in 2014								
C1	R-2577 (part)	US 158	Forsyth Co. Line to US-220 (in conjunction w/ Bypass) (refer to 2020 for more; remainder of the project lies in Forsyth and Rockingham Cos.)	4.6	2 lane	4-5 lane	Minor Arterial	Yes
C7	U-2525 (part)	Eastern Urban Loop	Lawndale Dr. to US 70 (refer to 2020 for the remainder)	13.0	N/A	6 lane freeway	Interstate	Yes

Horizon Year 2014 Projects Map 3.2



Legend

- Metropolitan Area Boundary
- County Line
- Interstates
- US Highways
- State Highways
- Railroads
- 2014 Project Reference
- 2004 Project Reference
- New Location Projects 2014
- New Location Projects 2004
- Horizon Year Projects 2014
- Horizon Year Projects 2004
- 2014 Horizon Year Interchanges Grade Separation
- 2014 Horizon Year Interchanges Interchange

0 0.5 1 2 3 4 5 Miles



August 26, 2004

Mapping prepared by Kimley-Horn and Associates, Inc.
for the Greensboro Urban Area Long-Range Transportation Plan
Data Sources: Guilford County, the City of
Greensboro, FEMA, the U.S. Census Bureau, KHA,
and NCDOT

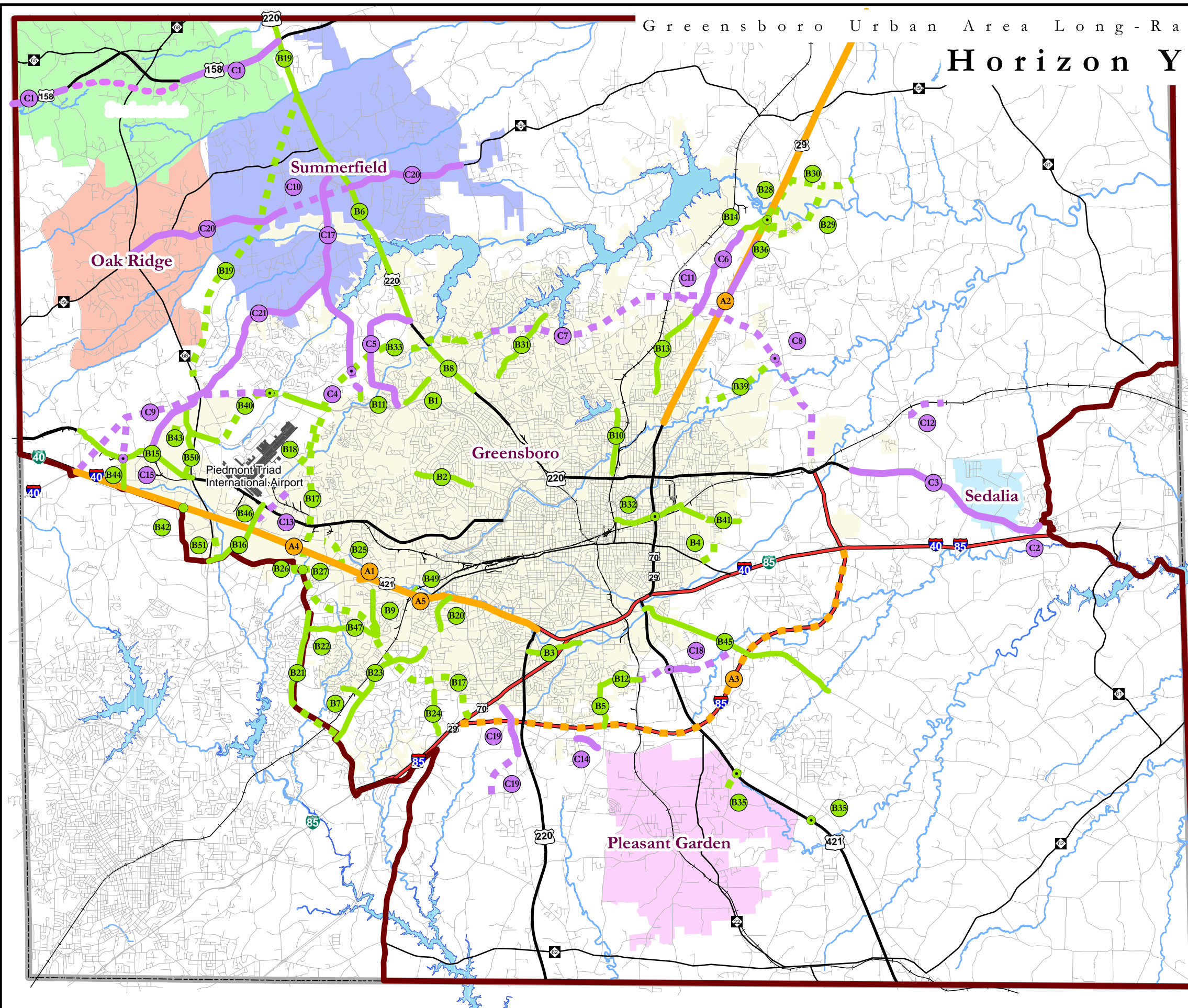
2015-2020

This period includes the completion of the final segments of the Urban Loop project as well as the I-40/NC 68/I-73 Connector and other airport area projects. This period also includes a number of significant connections and widenings as identified on the Thoroughfare Plan including the widening of US 70 east of Greensboro to the Alamance County line.

Table 3.12 — 2020 Roadway Projects

2015 - 2020								
ID	TIP#	Facility	Description / Extents	Length (miles)	Existing # Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?
C1	R-2577 (part)	US 158	Forsyth Co. Line to US 220 (includes Stokesdale Bypass). (refer to 2014 for more; remainder of the project lies in Forsyth Co.)	6.8	2 lane	4-5 lane	Minor Arterial	Yes
C2	R-2910 (part)	US 70	Rock Creek Dairy Rd. to Alamance County Line (.3 to MAB). (remainder of the project lies in Alamance Co.)	0.3	2 lane	5 lane	Major Collector	Yes
C3	U-2581	US 70	Mt Hope Church Rd. to Rock Creek Dairy Rd.	5.2	2 lane	5 lane	Minor Arterial	Yes
C4		Fleming Road / Lewiston Road	Fleming Rd. to Lewiston Rd. connection and interchange at Urban Loop	0.6	N/A	4-5 lane	Freeway / Expressway & Minor Arterial	Yes
C5		Horsepen Creek Road	New Garden Rd. to Battleground Ave.	3.4	2 lane	4-5 lane	Collector	No
C6		Summit Avenue	Brightwood School Rd. to Bryan Park Rd.	2.6	2 lane	3-5 lane	Minor Arterial	No
C7	U-2525 (part)	Eastern Urban Loop	Lawndale Dr. to US 70. (refer to 2014 for the remainder of the project)	13.0	N/A	4-6 lane freeway	Interstate	Yes
C8		E Cone Blvd / Urban Loop Interchange	Interchange with East Cone Blvd. and Urban Loop	N/A	N/A	N/A	Interstate	Yes
C9		I-40 / NC 68 / I-73 Connector	Old Oak Ridge Rd. to I-40	7.6	N/A	4-6 lane freeway	Interstate	Yes
C10		NC 150 Realignment	New location, from Brookbank Road to US 220 (see C20 for remainder)	1.9	N/A	2 lane	Major Collector	No
C11		Hicone Road Extension	Lee's Chapel Rd. to Summit Ave.	0.8	N/A	3 lane	Minor Arterial	No
C12		Carmon / McLeansville Road Connector	Knox Rd. to McLeansville Rd.	1.1	N/A	2 lane	Collector	No
C13		Gallimore Dairy Road / Friendly Avenue	Realign for continuity	0.2	5 lane	5 lane	Minor Arterial	No
C14		Ritters Lake Road Realignment	Connect with Wolfetrail at Randleman Rd.	0.4	2 lane	3 lane	Minor Arterial	No
C15		Sandy Ridge Road Extension	Market St. to Airport Connector and interchange at Market St.	1.0	N/A	4 lane divided	Major Collector	Yes
C17		Pleasant Ridge Road	Lewiston Rd. to Summerfield Rd.	5.0	2 lane	5 lane	Major Collector	Yes
C18		Vandalia Road Extension	Pleasant Garden Rd. to Alamance Church Rd. & US 421 interchange	2.7	N/A	5 lane	Freeway / Expressway & Minor Arterial	Yes
C19		South Holden Road	South of Bus. I-85 to Kivett Dr. - part on new location	2.4	2 lane	4-5 lane	Minor Collector	No
C20		NC 150 Realignment / Widening	On existing Brookbank Road and existing Auburn Road from NC 68 Lake Brandt Road (see C10 for remainder)	7.5	2 lane	3 lane	Major Collector	No
C21		Pleasant Ridge Road	Market St. to Lewiston Rd.	8.0	2 lane	3 lane	Major Collector	No

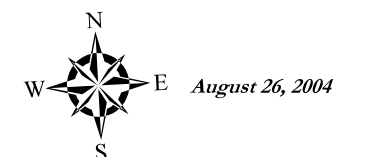
Horizon Year 2020 Projects Map 3.3



Legend

- Metropolitan Area Boundary
 - County Line
 - Interstates
 - US Highways
 - State Highways
 - Railroads
 - 2020 Project Reference
 - 2014 Project Reference
 - 2004 Project Reference
 - 2020 Horizon Year Interchanges
 - 2014 Horizon Year Interchanges
 - Interchange
 - Grade Separation
 - Interchange
- New Location Projects**
- 2020
 - 2014
 - 2004
- Horizon Year Projects**
- 2020
 - 2014
 - 2004

0 0.5 1 2 3 4 5 Miles



August 26, 2004

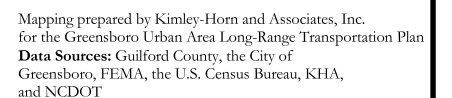
2021-2030
Noteworthy projects include improvements along US Hwy 29, a series of railroad grade separations, and the Airport Connector. It is also anticipated that the remaining lower priority Thoroughfare Plan connections will be completed.

Table 3.13 — 2030 Roadway Projects

2021 - 2030								
ID	TIP#	Facility	Description / Extents	Length (miles)	Existing # Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?
D1	R-2580 (part)	US 158	US 220 to Rockingham Co. Line. (remainder of the project lies in Rockingham Co.)	1.5	2 lane	4-5 lane	Minor Arterial	Yes
D2		US 29	New single point urban interchange at Brown Summit / Turner Smith Connector	N/A	N/A	4-6 lane	Interstate	Yes
D3		Penry / Ward / Youngs Mill Connector	McConnell Rd. to Huffine Mill Rd. (realign & improve existing)	3.1	2 lane	3 lane	Major Collector	Yes
D4		Franklin Road	Railroad grade separation	N/A	N/A	N/A	N/A	No
D5		Ward Road	Railroad grade separation	N/A	N/A	N/A	N/A	No
D6		Mackay Road	Railroad grade separation	N/A	N/A	N/A	N/A	No
D7		Hilltop Road	Railroad grade separation	N/A	N/A	N/A	N/A	No
D8		Aycock Street	Railroad underpass replacement (in conjunction with PART)	N/A	N/A	N/A	N/A	No
D9		East Market Street	Railroad underpass replacement	N/A	N/A	N/A	N/A	No
D10		Rankin Mill / Flemingfield Connector	South of Keeley Rd. to Huffine Mill Rd.	0.7	2 lane	3 lane	Collector	No
D11		High Rock Road Extension	US 70 to Frieden Church Rd. (connect & improve existing facilities)	5.5	2 lane	2 lane	Collector	No
D12		Wades Store Road Extension	Mt. Hope Church Rd. to Alamance Church Rd.	1.7	2 lane	2 lane	Local	No
D13		NC 62 / Liberty Road	New Garden Rd. to Bulb Rd.	1.1	2 lane	2 lane	Major Collector	No
D14	R-2612 (part)	Burnetts Chapel / Steeple Chase / Hagen Stone Park Connector	Burnetts Chapel Rd. to Company Mill Rd., new alignments	3.3	N/A	2 lane	Freeway/Expressway & Collector	Yes
D15		Airport Connector	Sandy Ridge Rd. Ext. (at I-73 Connector) to Forsyth Co. (remainder to Winston-Salem Urban Loop / I-74)	3.7	N/A	4 lane freeway	Freeway/Expressway	Yes
D16		Strawberry Road Extension	NC 150 to Lake Brandt Rd.	1.4	2 lane	2 lane	Local	No
D17		Youngs Mill / Southeast School Connector	Millpoint Rd. to Southeast School Rd.	1.2	N/A	2 lane	Minor Arterial	Yes
D18		US 29	Widen & upgrade to interstate, north of Urban Loop to Rockingham Co. line	5.5	4 lane freeway	6 lane freeway	Interstate	Yes
D19		South Dudley Street	Railroad grade separation (in conjunction with PART)	N/A	N/A	N/A	N/A	No
D20		South English Street	Railroad grade separation	N/A	N/A	N/A	N/A	No
D21		Colony Road	Railroad grade separation	N/A	N/A	N/A	N/A	No
D22		Tate Street	Railroad grade separation (in conjunction with PART)	N/A	N/A	N/A	N/A	No
D23		Benbow Road	Railroad grade separation (in conjunction with PART)	N/A	N/A	N/A	N/A	No
D24		Nealtown Road / McKnight Mill Road Connector and Extension	Huffine Mill Rd. to Eckerson Rd. (connect & improve existing facilities)	4.0	2 lane	2-3 lane	Major Collector	No
D25		Knox Road Extension	Carmon to Frieden Church Rd., w/ railroad grade separation	0.3	N/A	2 lane	Collector	No
D26		Creekview / Butler Road Connector	McCleansville Rd. to Huffine Mill Rd.	0.3	N/A	2 lane	Local	No

2021 - 2030 (continued)								
ID	TIP#	Facility	Description / Extents	Length (miles)	Existing # Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?
D27		Williams Dairy / Millpoint Road Connector	Millpoint Rd. to Williams Dairy Rd.	0.6	N/A	2 lane	Collector	No
D28		Bishops Road - Ritters Lake Road Connector	S. Holden Rd. to Ritters Lake Rd.	0.8	2 lane	3 lane	Collector	No
D29		Florida Street Extension	Franklin Blvd. Ext. to Mt. Hope Church Rd. (new & improve existing)	4.0	N/A	4 lane divided	Major Collector	Yes
D30		Hicone Road Widening	US 29 to Hines Chapel Rd.	3.3	2 lane	5 lane	Minor Arterial	No
D31		Summit Ave Extension (info only, not in LRTP)	Greenbrook Rd to Benaja Rd	1.4	N/A	2 lane	Local	No

Horizon Year 2030 Projects



The following table consists of projects that are exempt from air quality conformity regulations. These projects may therefore proceed in the event of a conformity lapse.

Table 3.14 — Exempt Projects List

ID	Facility	TIP#	Description / Extents	(miles)	# Lanes	Horizon Year # Lanes	Federal Functional Class	Regionally Significant?	Exempt?	Reflected in Network Coding?	CMAQ	New / Revised Since Last Plan
2004 Horizon Year												
A2	US 29	R-984	16th St. to Rockingham county line (pavement rehab)	10.9	4 lane divided	4 lane divided	Freeway/Expressway	Yes	Yes	Yes		
A6	Spring Garden Street Median		Between Freeman Mill Rd. and Jackson St.	0.3	4 and 2 lane	Divided	Collector	No	Yes	No		
2014 Horizon Year												
B32	East Market Street		Streetscape and Traffic Management		6 lane divided	4 lane divided	Principal Arterial	No	Yes	Yes		New
B37	Greensboro Signal / ITS System	U-4711		N/A	N/A	N/A	N/A	No	Yes	No	Yes	
2030 Horizon Year												
D4	Franklin Road		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D5	Ward Road		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D6	Mackay Road		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D7	Hilltop Road		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D8	Aycock Street		Railroad underpass replacement (in conjunction with PART)	N/A	N/A	N/A	N/A	No	Yes	N/A		
D9	East Market Street		Railroad underpass replacement (in conjunction with PART)	N/A	N/A	N/A	N/A	No	Yes	N/A		
D19	South Dudley Street		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D20	South English Street		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D21	Colony Road		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D22	Tate Street		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	N/A		
D23	Benbow Road		Railroad grade separation	N/A	N/A	N/A	N/A	No	Yes	Yes		New